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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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EXAMINER	
HSU, G	
ART UNIT	**PAPER NUMBER**
1627	13

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

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Office Action Summary

Application No.	Applicant
09/122,576	Slev et al.
Examiner	**Group Art Unit**
Grace Hsu, Ph.D.	1627

☒ Responsive to communication(s) filed on *Nov 24, 2000*

☐ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire *three* month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claim

☒ Claim(s) *1-116* is/are pending in the applicat

Of the above, claim(s) *2-5, 9-14, 20-29, and 32-116* is/are withdrawn from consideration

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) *1, 6-8, 15-19, 30, and 31* is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☒ Some* ☒ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

DETAILED ACTION

1. A Response to Restriction Requirement and A Petition for a Three Month Extension of Time, respectively received November 24, 2000, were entered jointly as Paper No. 12.

Election/Restriction

2. Applicants' election of:

[1] Group I, with traverse, claims 1, 6-19 and 30-31; and

[2] resin species as indicated in Examples 2 and 3, wherein a resin of the claimed method is identified as "HCAM resin" or "hydrazyl-carbonyl-amino methylated polystyrene resin," such that in a derivatized resin of formula (I):

X = O
Y = -NH-
Z = absent
R4 = $-NH_2$, i.e., -NH-R3, "wherein R3 is a protecting group, provided that when R4 is -NH-R3 . . ., then the protecting group is removed and replaced by -H in the final product" as indicated in Examples 2 and 3

for examination purposes, is acknowledged.

Applicants' traversal was made on that [1] an election had been made on the record of Group I, claims 1-27 and 29-31, as set forth in the May 9, 2000 Response; and that [2] that no serious search burden exists as the claimed invention included the same generically patentable concepts.

Applicants' arguments are found non-persuasive. It is maintained that: [1] Group I as elected in the May 9, 2000 Response contained different inventive concepts directed to different products and uses; such that [2] an undue search burden exists, because divergent searches requirements are required for the inventions encompassed by that group, because those inventions are classified in

different classification and subclassifications. The requirement is still deemed proper and is therefore made **FINAL**.

3. Claims 2-5, 9-14, 20-29 and 32-116 are withdrawn from further consideration by the Examiner under 37 CFR 1.142(b), as being drawn to non-elected inventions and/or species, the requirement traversed in Paper Nos. 9-10 and 12.

Status of Claims

4. Claims 1, 6-8, 15-19 and 30-31 are under examination in the current application.

New Grounds of Rejection

Claim Objections

5. Claim 31 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.

Claim 31 refers to "the method according to claim 30, wherein reactant (A) is selected from the group consisting of . . ." However, claim 30 only refers to a method of claim 6, which refers to the substituent groups R and R2, respectively, which are selected from two separate lists of functional groups, while claim 6 directly refers to a "reactant (A)" as referred to in dependent claim 31. Applicants are requested to amend claim 30 to clarify proper claim dependency from claim 6.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. § 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.
>
> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1, 6-8, 15-19 and 30-31 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a method for the production of

[a] a specific types of resin, i.e., a HCAM resin (see, instant specification, the use of which is exemplified in the instant specification by Examples 1-26, especially Examples 2 and 3)

[b] wherein said HCAM resin is associated or defined by:

[1] a derivatized resin of formula (I):

X = O
Y = -NH-
Z = absent
R4 = $-NH_2$, i.e., -NH-R3, "wherein R3 is a protecting group, provided that when R4 is -NH-R3 . . ., then the protecting group is removed and replaced by -H in the final product" as indicated in Examples 2 and 3; and

[2] specific compositions attached to the HCAM resin as defined in the instant specification at page 34, lines 21-29 to page 35, lines 1-17)

[3] the use of specific protecting groups (see, instant specification at page 28, lines 6-29 to page 30, lines 1-16)

for the claimed process, ***but does not*** reasonably provide enablement for ***all*** "methods for production of ***all*** derivatized resins encompassed by the definition of formula (I)." The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to the invention commensurate in scope with these claims.

Factors considered in making such determinations are set forth in *In re Wands*, 858 F.2d 731, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988). As discussed below, those factors include, but are not limited to, the: (1) breadth of the claims; (2) nature of the invention; (3) state of the prior art; (4) level of one of ordinary skill; (5) level of predictability in the art; (6) amount of direction provided by the inventor; (7) existence of working examples; and (8) quantity of experimentation needed to make or use the invention cased on the disclosure content.

In the present case, [1] the breadth of the claims encompass methods for production of a derivatized resin, which encompass amides (i.e., R4-NH-C(O)-Y-Z-SS, wherein X is O), thio-amides (i.e., R4-NH-C(S)-Y-Z-SS, wherein X is S) and imines (i.e., R4-NH=C(N-R7)-Y-Z-SS, wherein X is N-R7). However, the examples in the specification teach the production and/or use of only amide based derivatized resins to yield positive or negative results (see, instant specification Examples 1-26, especially Examples 2 and 3 teaching a specific types of resin, i.e., a HCAM resin; at page 34, lines 21-29 to page 35, lines 1-17 and at page 28, lines 6-29 to page 30, lines 1-16); [2] the nature of the invention cannot be determined without knowing the exact components used in the method steps in the production of derivatized resins, other than components and method steps associated with the production of amide based resins, i.e., such as

thio-amides (i.e., R4-NH-C(S)-Y-Z-SS, wherein X is S) and imines (i.e., R4-NH=C(N-R7)-Y-Z-SS, wherein X is N-R7) in the methods of the instant invention; [3] and [5] the state of the art and the level of predictability in the art cannot be predicted with any certainty as to how specific resins other than amide based resins, i.e., such as thio-amides (i.e., R4-NH-C(S)-Y-Z-SS, wherein X is S) and imines (i.e., R4-NH=C(N-R7)-Y-Z-SS, wherein X is N-R7) can be produced and/or used for various solid phase synthesis as described in the instant specification and are likely to provide productive results beyond those methods taught for the production of amide based resins in the specification; [4] and [6] the inventor provides no guidance beyond the methods taught in the specification as previously mentioned. As a result one of ordinary skill in the art could not predict what components and alternate synthesis steps are necessary in the synthesis or production of resins other than amide based resins; and [7] and [8] while the existence of working examples are limited to Examples 1-26, especially Examples 2 and 3 teaching the synthesis of a specific amide based resin, i.e., a HCAM resin (at page 34, lines 21-29 to page 35, lines 1-17 and at page 28, lines 6-29 to page 30, lines 1-16), an indeterminate quantity of experimentation would be necessary to determine all potential and/or alternate types of method steps for the synthesis of derivatized resins, other than amide based resins, such as thio-amides (i.e., R4-NH-C(S)-Y-Z-SS, wherein X is S) and imines (i.e., R4-NH=C(N-R7)-Y-Z-SS, wherein X is N-R7) could be produced by methods of the claimed invention.

In light of the preceding discussion, one skilled in the art ***could not practice*** the claimed invention ***without undue experimentation,*** as claims 1, 6-8, 15-19 and 30-31 fail to correlate reasonably with either the enabling disclosure of the specification.

8. Claims 1, 6-8, 15-19 and 30-31 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. Claim 1 is vague and indefinite in that it recites the following terms:

[1] in the preamble: "derivatized resin"; it is unclear what the aforementioned term refers to, as the metes and bounds of the aforementioned claim cannot be determined as the specification, claims and art do not recognize what the generic "derivatized" defines, as the claims fail to define what makes a resin derivatized; applicant is requested to point to where in the specification the term "derivatized resin" is defined and to clarify the aforementioned term and/or how a resin of the claimed invention is derivatized (i.e., , what chemical functional group manipulations or transformations results in such a "derivatized resin") to yield a derivatized product produced as a result of the claimed method;

[2] in the substituent definition section: [a] as associated with the term R4: "a protecting group"; it is unclear what the aforementioned term refers to, as the metes and bounds of the aforementioned claim cannot be determined as the specification, claims and art do not recognize what the generic "protecting group" defines, as the claims fail to define what specific types of protecting groups are used in the production of a resin derivatized; applicant is requested to point

to where in the specification the term is defined and to clarify what types of protecting groups are used in the production and/or synthesis of resins of the claimed invention [b] as associated with the term Z: [1] "a substituent selected from the group consisting of -NH-, -O-, -(C=O), -S-. . . alkyl, alkenyl . . . and combinations thereof"; it is unclear what the aforementioned term refers to, as the metes and bounds of the aforementioned claims cannot be determined as the specification, claims and art do not recognize what the aforementioned generic terms define. For example, the element Z, which is a component of formula (I) of the claimed invention may be chosen from a series of terms, including a Markush groups of various components, but what constitutes "combinations thereof" of those chemical functional group moieites, how are each potential element, functional group or combination etc. linked to each other and with what types of chemical bonds form products and/or intermediates of the claimed invention. Applicants are requested to point to where in the specification the aforementioned terms and to clarify the claims accordingly.; [2] the term "under conditions for peptide synthesis, functional groups of Z are protected"; it is unclear what the aforementioned term refers to, as the metes and bounds of the aforementioned claims cannot be determined as the specification, claims and art do not recognize what the aforementioned generic "conditions for peptide synthesis" define. For example, are such conditions for peptide synthesis referring to conventionally known organic chemical reaction conditions for attachment of conventional protecting groups used in peptide synthesis, such as FMOC, t-BOC, CBZ, etc. Applicants are requested to point to where in the specification the aforementioned terms and to clarify the claims accordingly.

10. Claim 1 recites the following limitations: [1] in the preamble: "**the** formula (I); [2] in step (I): "**the** product (I)"; and [3] in step (ii): "the derivatized resin (I)." There is insufficient antecedent basis for the aforementioned limitations."

11. Claim 6 is vague and indefinite for the recitation of the following terms: [1] "R is a leaving group" and [2] "R2 is a leaving group, same or different than R1"; it is unclear what the aforementioned terms refer to, as the metes and bounds of the aforementioned claims cannot be determined as the specification, claims and art do not recognize what the aforementioned generic term "leaving group" defines or how a "leaving group" can be the "same or different than" relative to another leaving group without knowing what such groups are. Applicants are requested to point to where in the specification the aforementioned terms and to clarify the claims accordingly.;

12. Claim 15 is vague and indefinite for the recitation of the following terms: "R4 is converted to a reactive derivatized resin bearing a free amine by removal of R3."; it is unclear what the aforementioned term refers to, as the metes and bounds of the aforementioned claims cannot be determined as the specification, claims and art do not recognize what the aforementioned generic term "reactive" defines. For example, what constitutes a reactive derivatized resin from a non-reactive derivatized resin in the claimed invention, how are such resins transformed from "inactive" to "reactive and what chemical functional group moieites are converted to what other active functional groups, etc.? Applicants are requested to point to where in the specification the aforementioned terms and to clarify the claims accordingly.

13. Claim 16 is vague and indefinite for the recitation of the following terms: "said reactive derivatized resin is contacted with an appropriately protected aldehyde or ketoamide to form a semicarbazone derivatized resin."; it is unclear what the aforementioned term refers to, as the metes and bounds of the aforementioned claims cannot be determined as the specification, claims and art do not recognize what the aforementioned generic terms "reactive derivatized resin" and "appropriately protected aldehyde or ketoamide" defines. For example what constitutes a "reactive derivatized resin" or an "appropriately protected aldehyde or ketoamide?" Applicants are requested to point to where in the specification the aforementioned terms and to clarify the claims accordingly.

14. Claim 18 is vague and indefinite for the recitation of the following phrases: "wherein said aldehyde is orthogonally protected."; it is unclear what the aforementioned term refers to, as the metes and bounds of the aforementioned claims cannot be determined as the specification, claims and art do not recognize what the aforementioned generic term "orthogonally protected" in relation to aldehyde chemical group defines. For example, how is such an "aldehyde is orthogonally protected", i.e., with what type of "protecting group," and how is such an aldehyde is protected "orthogonally" relative to what other chemical functional group moieties (i.e., what makes the protected aldehyde chemical conformation orthogonal in reference to neighboring functional groups?). Applicants are requested to point to where in the specification the aforementioned terms and to clarify the claims accordingly.

15. Claim 19 recites the following term or limitation: "said argininal guanidino side chain"; There is insufficient antecedent basis for the aforementioned limitation.

16. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. Steps are missing from the claimed method for producing a derivatized resin.

In particular, [a] how the starting material of formula (C) was assembled; [b] what is the order, connection or attachment or order of assembly for each of the elements, intermediates and/or components that form each intermediate and ultimate product in the synthetic construction of the starting material of formula (C) used in the method steps for production of a derivatized; and [c] in step (ii) by what steps is "recovery" of the "derivatized resin" accomplished. (See, instant specification at pages 14-19, especially page 16, lines 6-30 to page 19, lines 1-6, which includes within the four synthetic routes set forth for the production of derivatized resins of the claimed invention, synthetic steps for the formation of starting materials, such as those represented by formula (C) of the claimed invention.

Therefore, the metes and bounds of the aforementioned claims cannot be determined as the specification, claims and the art do not recognize a defined set of compounds, active sites or screening methods that define the above-identified generic terms.

Claim Rejections - 35 USC § 102

17. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The claimed invention is directed to a "method for production of a derivatized resin represented by formula (I) . . . wherein said derivatized resin represented by formula (I) is prepared by a process, comprising the steps of (I) reacting a starting material represented by formula (C) R1-(C=X)-Y-Z-SS, wherein R1 is a leaving group with a reactant of formula (D) R4-NH2 to form the product (I) of formula R4-NH-(C=X)-Y-Z-SS and (ii) recovering the derivatized resin (I).

For this office action, the claim language has been interpreted based upon the transitional term "comprising", i.e., wherein the open-ended term comprising, would include alternate method and corresponding steps resulting in the synthesis of such resins and associates intermediate and/or final products of the claimed invention.

18. Claims 1, 6-8, 15-19 and 30-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Galpin et al. (Peptides: Structure and Function: Proceedings of the Ninth American Peptide Symposium, 1985, Rockford, Illinois: Pierce Chemical Company, pages 799-802).

Galpin et al. discloses: [1] methods for the preparation of derivatized semicarbazone resins (see, page 799, lines 15-24) for use in the solid phase synthesis of peptide aldehyde

inhibitors; [2] wherein appropriate N terminal protected C-terminal aldehyde precursors or derivatives are linked or synthesized to form target peptides and/or corresponding libraries which are then anchored or condensed to a resin support via a semicarbazone linkage (i.e., an HCAM resin) and are subsequently cleaved via acidic hydrolysis; [3] wherein the synthesis incorporates conventional peptide chemical and solid phase synthesis techniques, such as deprotection, coupling, orthogonal side-chain reactions, etc., aforementioned aldehyde functionality or functionalities are protected as stable, selectively cleavable semicarbazone species that preserves the chiral integrity of such precursors; [4] wherein said polymeric semicarbazide hydrochlorides are derived from poly[methylene(polyphenyl isocyanate], comprising the steps of [a] reaction of the polymeric isocyanate with tert butyl carbazate to form a semicarbazide hydrochloride after the removal of the boc protecting group via acid hydrolysis (i.e., H-Cl/ethyl acetate), resulting in a highly cross-linked insoluble polymer; [b] to which was reacted a protected C-terminal protected aldehyde, such as a benzyloxycarbonyl phenyl alanine aldehyde in the presence of sodium acetate; [c] the peptide chain extension via coupling conventionally protected amino acids with conventional coupling techniques and reagents (such as DCCI/HOBt, see page 799, lines 10-14); [d] The protected dipeptide semicarbazone was then isolated by a washing procedure allowing excess reagents and impurities to be removed from the resin bound protected dipeptide semicarbazone; or instead a repeating coupling steps to yield peptide sequences of different lengths, followed by cleavage of said sequence from the resin using an acid hydrolysis (see, page 801, lines 8-10); and [5] it was determined that an advantage of using a polymer bound

semicarbazone in the synthesis of C-terminal protected peptide aldehyde inhibitors is that the protected amino acids are soluble in organic, dipolar aprotic solvents allowing facile precipitation by the addition of water or organic solvents such as ether, allowing purification by reprecipitation and washing (see, page 800, lines 6-10).

Therefore, Galpin et al. anticipates the claimed invention.

19. Claims 1, 6-8, 15-19 and 30-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Murphy et al. (J. Am. Chem. Soc., 1992, 114, 3156-3157).

Murphy et al. discloses: [1] methods for the preparation of derivatized amino acid aldehyde semicarbazone resins (see, col. 2, lines 39-40), comprising the synthesis of a resin product material, identified therein as peptide C-terminal aldehydes and corresponding derivatives or analogues, useful in automatable solid phase of peptide C-terminal aldehydes; [2] which represent "formidable synthetic targets due to their inherent chemical lability and their multifarious functionalities, which often require orthogonal protection with all the physical and chemical properties requires for solid phase synthesis of peptides (see, page 3157, col. 2, lines 8-9); [3] this method relies on the protection of an aldehyde as a function of a stereochemically stable semicarbazone; [4] this method involves the following general steps , i.e., the protected amino acid aldehyde semicarbazones are deprotected at the N-terminus and coupled with protected amino acids or protected peptides to give a protected peptide C-terminal semicarbazone. After the desired number of deprotection/coupling cycles are complete, the protected peptide semicarbazone is treated with aqueous acid/formaldehyde to regenerate the

aldehyde and cleave it from the solid support. The resulting protected PA can then be deprotected if necessary (see, col. 2, lines 23-38); [5] wherein the method is exemplified according to Scheme I and those defined in Table 1, see col. 2 intermediate that involves the reaction of tert-butylcarbazate with carbonyldiimidazole iin dimethylformamide followed by treatment with trans-4-(aminomethyl)cyclohexanecarboxylic acid benzyl ester, which was subsequently hydrogentated, treated with trifluoro acetic acid, reacted with a-Boc-N-L-argininal and base to yield the product identified therein as compound 4, which was subsequently coupled to a commercially available solid support resin, identified as an MBHA resin, which is used in the assembly of peptides using std. Boc protocols, and cleaved from the resin with dil. aq. acid/formaldehyde to give protected peptide C-terminal aldehydes. Argininal-containing. peptide aldehydes with various hydrogen/Pd labile protecting groups can be deprotected in a single step to give the unprotected peptide aldehydes after purification by reverse-phase HPLC. This preformed linker may be attached to resins, insoluble supports (as exemplified in compounds 8-11) which are suitable for use in conventional peptide synthesizers.

Therefore, Murthy et al. anticipates the claimed invention.

Status of Claims

20. No claims are allowed in the above-identified application.

Conclusion

21. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Grace C. Hsu, Ph.D., J.D. whose telephone number is (703) 308-7005. The Examiner may be reached during normal business hours, Monday through Friday from 8:30 am to 5:30 pm (EST). A message may be left on the Examiner's voice mail.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Jythosna Venkat, Ph.D., may be reached at (703) 308-2439. The fax number assigned to Group 1627 is (703) 305-4242. Any inquiry of a general nature or relating to the status of this application should be directed to the Group 1627 receptionist whose telephone number is (703) 308-0196.

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Grace C. Hsu, Ph.D., J.D.

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